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Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

**Concept-Development Practice Page 27-1**

**Light**

1. The Danish astronomer Oleam Rømer made careful measurements of the period of a moon about the planet Jupiter. How this data enabled a calculation of the speed of light is described in your textbook on pages 534 and 535.

a. What is the diameter, in kilometers, of Earth's orbit around the sun?  
**200,000,000 km**

b. How much time is required for light to travel across the diameter of the orbit?  
**1000 s**

c. How do these two quantities determine the speed of light?  
**Speed = distance/time = (200,000,000 km)/(1000 s) = 200,000 km/s**

2. Study Figure 27.4 on page 536 in your textbook and answer the following:

a. Which have longer wavelengths, radio waves or light waves?  
**Radio waves**

b. Which have longer wavelengths, light waves or gamma rays?  
**Light waves**

c. Which have higher frequencies, ultraviolet or infrared waves?  
**Ultraviolet waves**

d. Which have higher frequencies, ultraviolet waves or gamma rays?  
**Gamma rays**

3. Carefully study Section 27.4 in your textbook and answer the following:

a. Exactly what do vibrating electrons emit?  
**Energy that is carried in an electromagnetic wave**

b. When ultraviolet light shines on glass, what does it do to electrons in the glass structure?  
**Ultraviolet light causes electrons to vibrate in resonance with the ultraviolet light.**

c. When energetic electrons in the glass structure vibrate against neighboring atoms, what happens to the energy of vibration?  
**The energy of vibration becomes heat.**

d. What happens to the energy of a vibrating electron that does not collide with neighboring atoms?  
**The energy is emitted as light.**

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**Conceptual Physics Practice Page Answer Key 28**